

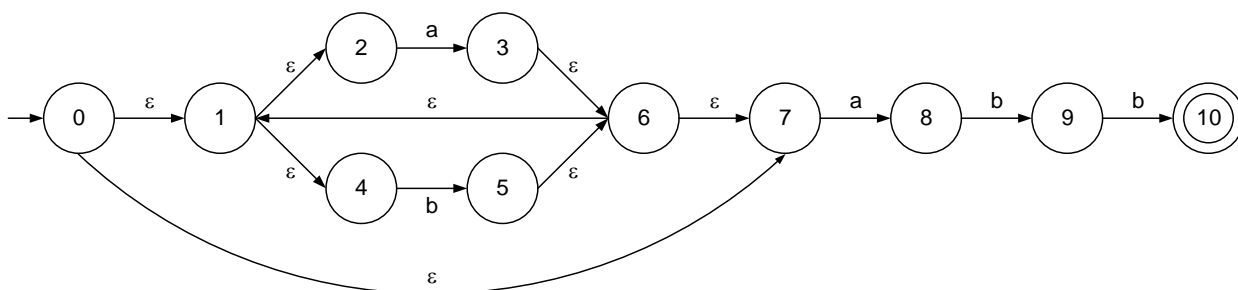


AFN- $\epsilon \Rightarrow$ AFD

OBJETIVO

Establecer equivalencias entre autómatas finitos no deterministas con transiciones ϵ y autómatas finitos deterministas, utilizando la Construcción de Subconjuntos.

EJEMPLO



DESARROLLO

δ	a	b	ϵ
$\rightarrow 0$	\emptyset	\emptyset	$\{1, 7\}$
1	\emptyset	\emptyset	$\{2, 4\}$
2	$\{3\}$	\emptyset	\emptyset
3	\emptyset	\emptyset	$\{6\}$
4	\emptyset	$\{5\}$	\emptyset
5	\emptyset	\emptyset	$\{6\}$
6	\emptyset	\emptyset	$\{1, 7\}$
7	$\{8\}$	\emptyset	\emptyset
8	\emptyset	$\{9\}$	\emptyset
9	\emptyset	$\{10\}$	\emptyset
*10	\emptyset	\emptyset	\emptyset

$$C-\epsilon(0) = \{0, 1, 2, 4, 7\} = A$$



$$\begin{aligned}\delta'(A, a) &= C-\varepsilon(\delta(A, a)) \\ &= C-\varepsilon(\delta(\{0, 1, 2, 4, 7\}, a)) \\ &= C-\varepsilon(\delta(0, a) \cup \delta(1, a) \cup \delta(2, a) \cup \delta(4, a) \cup \delta(7, a)) \\ &= C-\varepsilon(\emptyset \cup \emptyset \cup \{3\} \cup \emptyset \cup \{8\}) \\ &= C-\varepsilon(\{3, 8\}) \\ &= C-\varepsilon(3) \cup C-\varepsilon(8) \\ &= \{1, 2, 3, 4, 6, 7\} \cup \{8\} \\ &= \{1, 2, 3, 4, 6, 7, 8\} \\ &= B\end{aligned}$$

$$\begin{aligned}\delta'(A, b) &= C-\varepsilon(\delta(A, b)) \\ &= C-\varepsilon(\delta(\{0, 1, 2, 4, 7\}, b)) \\ &= C-\varepsilon(\delta(0, b) \cup \delta(1, b) \cup \delta(2, b) \cup \delta(4, b) \cup \delta(7, b)) \\ &= C-\varepsilon(\emptyset \cup \emptyset \cup \emptyset \cup \{5\} \cup \emptyset) \\ &= C-\varepsilon(\{5\}) \\ &= C-\varepsilon(5) \\ &= \{1, 2, 4, 5, 6, 7\} \\ &= C\end{aligned}$$

$$\begin{aligned}\delta'(B, a) &= C-\varepsilon(\delta(B, a)) \\ &= C-\varepsilon(\delta(\{1, 2, 3, 4, 6, 7, 8\}, a)) \\ &= C-\varepsilon(\delta(1, a) \cup \delta(2, a) \cup \delta(3, a) \cup \delta(4, a) \cup \delta(6, a) \cup \delta(7, a) \cup \delta(8, a)) \\ &= C-\varepsilon(\emptyset \cup \{3\} \cup \emptyset \cup \emptyset \cup \emptyset \cup \{8\} \cup \emptyset) \\ &= C-\varepsilon(\{3, 8\}) \\ &= C-\varepsilon(3) \cup C-\varepsilon(8) \\ &= \{1, 2, 3, 4, 6, 7\} \cup \{8\} \\ &= \{1, 2, 3, 4, 6, 7, 8\} \\ &= B\end{aligned}$$

$$\begin{aligned}\delta'(B, b) &= C-\varepsilon(\delta(B, b)) \\ &= C-\varepsilon(\delta(\{1, 2, 3, 4, 6, 7, 8\}, b)) \\ &= C-\varepsilon(\delta(1, b) \cup \delta(2, b) \cup \delta(3, b) \cup \delta(4, b) \cup \delta(6, b) \cup \delta(7, b) \cup \delta(8, b)) \\ &= C-\varepsilon(\emptyset \cup \emptyset \cup \emptyset \cup \{5\} \cup \emptyset \cup \emptyset \cup \{9\}) \\ &= C-\varepsilon(\{5, 9\}) \\ &= C-\varepsilon(5) \cup C-\varepsilon(9) \\ &= \{1, 2, 4, 5, 6, 7\} \cup \{9\} \\ &= \{1, 2, 4, 5, 6, 7, 9\} \\ &= D\end{aligned}$$



$$\begin{aligned}\delta'(C, a) &= C - \varepsilon(\delta(C, a)) \\ &= C - \varepsilon(\delta(\{1, 2, 4, 5, 6, 7\}, a)) \\ &= C - \varepsilon(\delta(1, a) \cup \delta(2, a) \cup \delta(4, a) \cup \delta(5, a) \cup \delta(6, a) \cup \delta(7, a)) \\ &= C - \varepsilon(\emptyset \cup \{3\} \cup \emptyset \cup \emptyset \cup \emptyset \cup \{8\}) \\ &= C - \varepsilon(\{3, 8\}) \\ &= C - \varepsilon(3) \cup C - \varepsilon(8) \\ &= \{1, 2, 3, 4, 6, 7\} \cup \{8\} \\ &= \{1, 2, 3, 4, 6, 7, 8\} \\ &= B\end{aligned}$$

$$\begin{aligned}\delta'(C, b) &= C - \varepsilon(\delta(C, b)) \\ &= C - \varepsilon(\delta(\{1, 2, 4, 5, 6, 7\}, b)) \\ &= C - \varepsilon(\delta(1, b) \cup \delta(2, b) \cup \delta(4, b) \cup \delta(5, b) \cup \delta(6, b) \cup \delta(7, b)) \\ &= C - \varepsilon(\emptyset \cup \emptyset \cup \{5\} \cup \emptyset \cup \emptyset \cup \emptyset) \\ &= C - \varepsilon(\{5\}) \\ &= C - \varepsilon(5) \\ &= \{1, 2, 4, 5, 6, 7\} \\ &= C\end{aligned}$$

$$\begin{aligned}\delta'(D, a) &= C - \varepsilon(\delta(D, a)) \\ &= C - \varepsilon(\delta(\{1, 2, 4, 5, 6, 7, 9\}, a)) \\ &= C - \varepsilon(\delta(1, a) \cup \delta(2, a) \cup \delta(4, a) \cup \delta(5, a) \cup \delta(6, a) \cup \delta(7, a) \cup \delta(9, a)) \\ &= C - \varepsilon(\emptyset \cup \{3\} \cup \emptyset \cup \emptyset \cup \emptyset \cup \{8\} \cup \emptyset) \\ &= C - \varepsilon(\{3, 8\}) \\ &= C - \varepsilon(3) \cup C - \varepsilon(8) \\ &= \{1, 2, 3, 4, 6, 7\} \cup \{8\} \\ &= \{1, 2, 3, 4, 6, 7, 8\} \\ &= B\end{aligned}$$

$$\begin{aligned}\delta'(D, b) &= C - \varepsilon(\delta(D, b)) \\ &= C - \varepsilon(\delta(\{1, 2, 4, 5, 6, 7, 9\}, b)) \\ &= C - \varepsilon(\delta(1, b) \cup \delta(2, b) \cup \delta(4, b) \cup \delta(5, b) \cup \delta(6, b) \cup \delta(7, b) \cup \delta(9, b)) \\ &= C - \varepsilon(\emptyset \cup \emptyset \cup \{5\} \cup \emptyset \cup \emptyset \cup \emptyset \cup \{10\}) \\ &= C - \varepsilon(\{5, 10\}) \\ &= C - \varepsilon(5) \cup C - \varepsilon(10) \\ &= \{1, 2, 4, 5, 6, 7\} \cup \{10\} \\ &= \{1, 2, 4, 5, 6, 7, 10\} \\ &= E\end{aligned}$$



$$\begin{aligned}
 \delta'(E, a) &= C-\varepsilon(\delta(E, a)) \\
 &= C-\varepsilon(\delta(\{1, 2, 4, 5, 6, 7, 10\}, a)) \\
 &= C-\varepsilon(\delta(1, a) \cup \delta(2, a) \cup \delta(4, a) \cup \delta(5, a) \cup \delta(6, a) \cup \delta(7, a) \cup \delta(10, a)) \\
 &= C-\varepsilon(\emptyset \cup \{3\} \cup \emptyset \cup \emptyset \cup \emptyset \cup \{8\} \cup \emptyset) \\
 &= C-\varepsilon(\{3, 8\}) \\
 &= C-\varepsilon(3) \cup C-\varepsilon(8) \\
 &= \{1, 2, 3, 4, 6, 7\} \cup \{8\} \\
 &= \{1, 2, 3, 4, 6, 7, 8\} \\
 &= B
 \end{aligned}$$

$$\begin{aligned}
 \delta'(E, b) &= C-\varepsilon(\delta(E, b)) \\
 &= C-\varepsilon(\delta(\{1, 2, 4, 5, 6, 7, 10\}, b)) \\
 &= C-\varepsilon(\delta(1, b) \cup \delta(2, b) \cup \delta(4, b) \cup \delta(5, b) \cup \delta(6, b) \cup \delta(7, b) \cup \delta(10, b)) \\
 &= C-\varepsilon(\emptyset \cup \emptyset \cup \{5\} \cup \emptyset \cup \emptyset \cup \emptyset \cup \emptyset) \\
 &= C-\varepsilon(\{5\}) \\
 &= C-\varepsilon(5) \\
 &= \{1, 2, 4, 5, 6, 7\} \\
 &= C
 \end{aligned}$$

RESULTADO

δ'	a	b
$\rightarrow A$	B	C
B	B	D
C	B	C
D	B	E
*E	B	C